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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,570	01/31/2007	Stephen Peter Hughes	102881-15 (FF39694/06)	1933
27389 7590 02/06/2009 NORRIS, MCLAUGHLIN & MARCUS 875 THIRD AVE 18TH FLOOR NEW YORK, NY 10022			EXAMINER TAKEUCHI, YOSHITOSHI	
			ART UNIT 1793	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/599,570	Applicant(s) HUGHES ET AL.	
	Examiner YOSHITOSHI TAKEUCHI	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1 and 3–14 are presented for examination. Claims 1, 3, 4, 7, 8, 11 and 12 are amended; and, claims 2 and 15 are cancelled.
2. The objections for claims 1, 7 and 11 are withdrawn due to the amendments to the claims.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claim 1, 3–7, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edwards et al (US 5,888,270) in view of Meissner (US 3,281,236).
 - a. Regarding claim 1, 5 – 7, Edwards teaches a process with the steps of: adding the copper sulfide matte and flux to an agitated slag phase (abstract); and injecting, from a discharge tip at the lower end of a top-submerged tubular lance (abstract and Figure 2), an oxidizing gas suitable for reacting with the matte to produce blister copper which forms or adds to a continuous blister copper phase below the iron-based silicate slag phase (abstract); wherein the depth of the iron based silicate slag phase and the level at which the lance tip is located in the slag phase are such that the injected gas agitates the slag phase (abstract, implied that the lance is located to agitate the slag phase, since the gasses perform the agitation and the gases are introduced by the lance) and reacts with copper sulfide matte dispersed in the slag phase (abstract). However, Edwards does not teach positioning the lance tip such that a jet or stream of the injected gas is unable to pass through the lower surface of the slag phase and the gas is substantially precluded

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from contacting the continuous copper phase; injection is at a mid-region of the height of the slag; or the injection is near the upper surface of the slag phase.

Meissner teaches a method of copper refining (title), and that the “primary consideration in introducing the feed into the molten copper pool is that the depth of introduction or blowing with respect to the surface of the molten pool be sufficient to obtain optimum operation...” (Column 6, line 72 to column 7, line 3). As a result, it would have been obvious to a person of ordinary skill at the time of the invention to optimize the Edwards process by adjusting the height of the lance so that the introduction of the gasses is optimized for the process, as described by Meissner.

b. Regarding claims **3, 4** Edwards in view of Meissner teaches the process of claim 1, but does not explicitly teach the slag phase having a depth of from about 700 mm to about 1.7 m.

However, because the processes and treated compositions are similar, in absence of proof to the contrary, it would be expected that the compositions taught by Edwards in view of Meissner would have similar slag phase having a depth of from about 700 mm to about 1.7 m as claimed. Such dimensions of the slag phase are inherent characteristics to the process as described. See MPEP § 2112.

c. Regarding claims **13** and **14**, Edwards teaches the use of carbon in the form of coal for the purpose of being used as a fuel (column 3, lines 3-4, as a fuel, the coal would be a reductant), but does not teach the coal in the form of lump coal. However, coal is commonly found in the form of lump coal, it would have been obvious to one of ordinary

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skill in the art at the time of the invention to use lumps of coal to introduce carbon as a reductant into the melt.

5. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edwards et al (US 5,888,270) in view of Meissner (US 3,281,236) as applied to claim 1 *supra*, and further in view of Poijarvi (WO 01/49890).

a. Regarding claims **8–10**, Edwards in view of Meissner teaches the process of claim 1 as discussed *supra*, modified with lime (column 5, line 33), but does not teach a iron-based silicate slag or ferrous calcium silicate olivine slag.

Poijarvi teaches a method for the production of blister copper (title), using fayalite (page 7, line 15), where fayalite is an iron-based silicate and is a type of olivine mineral. Poijarvi further teaches that “[i]ron silicate slag...can be used in a blister furnace depending on the composition of the concentrate.... If slag concentration is part of the slag processing then it is advantageous that the slag is iron silicate slag.” (Page 3, lines 21-26).

As a result, it would have been obvious to a person of ordinary skill at the time of the invention to use the fayalite of Poijarvi in the process of Edwards in view of Meissner, since Poijarvi teaches that it is advantageous to use an iron silicate slag if both matte and blister production take place in the same smelter, as is the case in the Edwards.

b. Regarding claims **11** and **12**, Edwards in view of Meissner teaches the process of claim 8 (see *supra*), modified with lime (column 5, line 33), where the ratio of CaO : Fe is within the claimed range (response to Office action page 65), but does not teach the ratios of Fe : SiO₂ or CaO : SiO₂ within the claimed range. However, Poijarvi teaches the

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concentration of Fe to SiO₂ in the fayalite slag to be: 28.7% Fe and 21% SiO₂, such that the Fe : SiO₂ ration is 1.367, well within the claimed range of 1.14 to 1.55. As a result, it would have been obvious to a person of ordinary skill at the time of the invention to use the fayalite with a Fe : SiO₂ ratio of 1.367 in the process of Edwards since fayalite is useful as a source of iron and silicate in the slag.

c. While Edwards teaches the use of CaO, it teaches the *preferred* ratio of CaO : SiO₂ to be of the *order* from 5 to 10 (column 3, lines 12-14), not the claimed CaO : SiO₂ ratio of 0.22 to 1.11. It was well known in the industry at the time of the invention that the SiO₂ in the sand reacts with the CaO, and iron oxide to form slag, FeSiO₃ and CaSiO₃. As a result, the ratio of the SiO₂ and CaO is a result-effective variable in terms of the flux of the slag.

Therefore, it would have been obvious to a person of ordinary skill at the time of the invention to adjust the ratio of CaO : SiO₂ to obtain the optimal mixture of components in the slag layer. Furthermore, “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454 (CCPA 1955). It would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the ratio of CaO : SiO₂ used in the Edwards process to optimize the components of the slag layer. See also MPEP § 2144.05(II).

Response to Arguments

6. Applicant's arguments with respect to claims 1 and 3-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Copper Smelting—Generalized,

www.elmhurst.edu/~chm/vchembook/335coppersmelter.html (last visited February 2, 2009).

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOSHITOSHI TAKEUCHI whose telephone number is (571) 270-5828. The examiner can normally be reached on Monday-Thursday 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit
1793

/YOSHITOSHI TAKEUCHI/
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